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ABSTRACT

Selected long-range effects of a preschool program were studied. Students who participated in an Education Consolidation and Improvement Act Chapter 1 preschool program in 1973-74 (n=28) were compared with an equal number not in the preschool program, and both groups were followed for the 13 years through grade 12. The preschool group achieved at a higher level than did controls and out-performed them on standardized reading tests from grades 3 through 11. The preschool group had higher grade point averages and exhibited better school behavior than did the control group. Differences in mathematics were not as pronounced, but the preschool group scored at a higher level in grades 4 through 8. The non-preschool group had more violations of the school district code of conduct and required more compensatory education services for underachieving students. Only 14% of the non-preschool group graduated, whereas 54% of the preschool group graduated. The preschool program made a significant difference in the academic success of these students. Twenty-five tables present student achievement data. An appendix charts rates of gain by both groups. (SLD)

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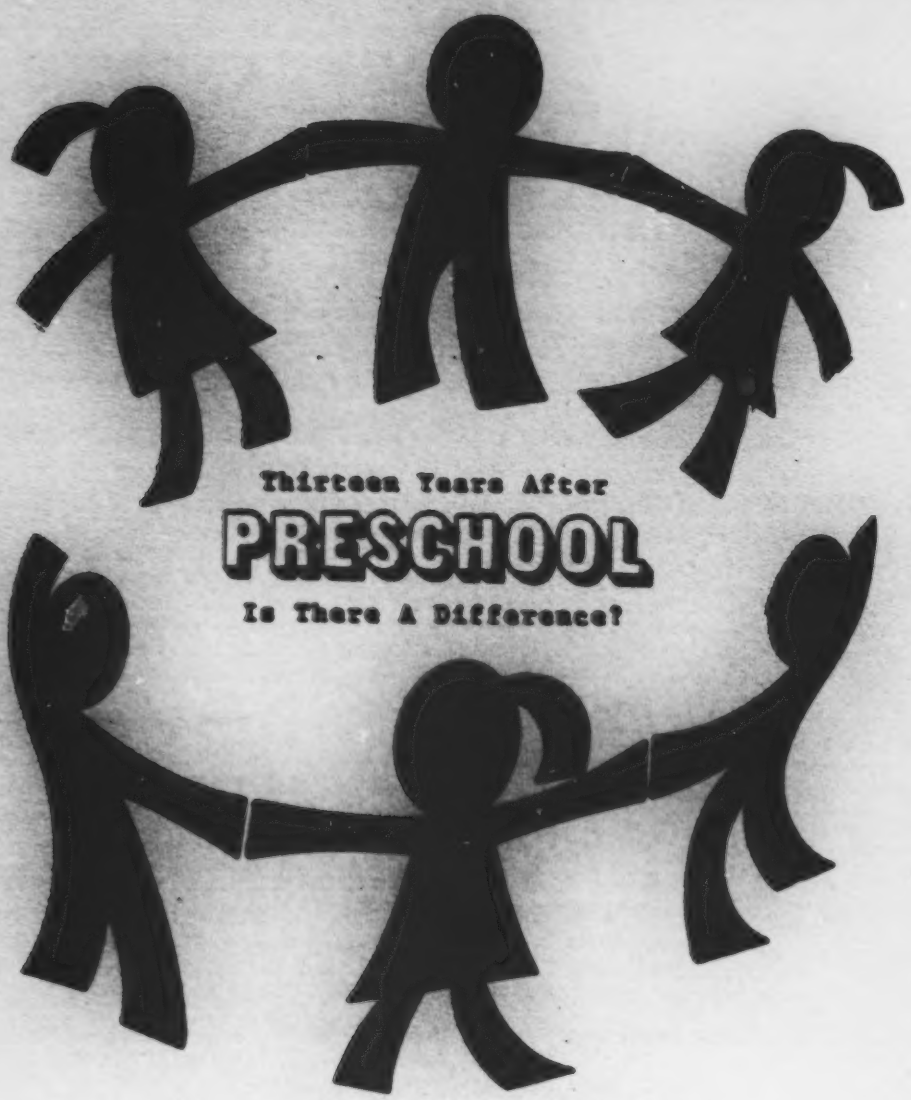

Thirteen Years After PRESCHOOL

Is There A Difference?

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Thirteen Years After Preschool -
Is There A difference?

Executive Summary

This study was designed to investigate selected long-range effects of a preschool program on the children in Detroit. Findings of the Detroit study support the results of other long term research on preschool programs including the Perry Preschool Project in Ypsilanti, Michigan. These investigations indicate that preschool experiences can have beneficial effects on the lives of young people.

Two groups of students were included in the Detroit study. The first group were students who participated in a Chapter 1 Preschool Program in 1973-74. The other group consisted of students who did not receive the services of a preschool program. The preschool and non-preschool groups in the Detroit study were followed for thirteen years from kindergarten through grade twelve.

Analysis of data related to reading indicated that the preschool group did achieve at a significantly higher level than the control group. The preschool group outperformed the non-preschool group on standardized tests in reading. The district administers such achievement tests in grades one through eight and eleven. The preschool group performed better than the non-preschool group beginning in grade three and continued to achieve at a higher level all the way through grade eleven. In addition, the preschool group mastered more objectives on the Michigan Educational Assessment Program (MEAP) test in reading which was administered in grades four and ten.

Differences between the groups' mathematics achievement was not as consistent as the reading achievement results. The preschool group did score at a higher level in mathematics at the fourth, fifth, seventh, and eighth

grade levels on standardized tests. There were no differences in the groups achievement on the mathematics tests of the MEAP.

The district has a Code of Student Conduct. The code lists both prohibited and illegal behaviors. Student Code of Conduct records of the preschool and non-preschool groups in grades five through twelve indicated that in seven of eight years the non-preschool group exhibited more violations of the code of conduct.

Federal and state funds are utilized to provide compensatory education services to underachieving students. In ten of the thirteen years more non-preschool students than preschool students required these services.

The preschool group had significantly higher grade point averages in seven of the eight semesters in high school. The preschool group also attained a significantly higher cumulative grade point average in high school than the other group.

The number and percent of the preschool group passing Detroits High School Proficiency test exceeded the non-preschool group in every area of the test reading, mathematics, and writing.

In June, 1987, the projected graduation date for both groups in the study, fifty-four percent of the preschool group graduated while only fourteen percent of the non-preschool group graduated.

In summary, students who participated in a preschool program showed better achievement in reading and mathematics, had higher grade point averages, required less compensatory education service, exhibited better school behavior, and were more likely to graduate than those students who did not attend a preschool program.

Thirteen Years After Preschool-
Is There a Difference?

Introduction

Preschool education in the United States has continued to grow since 1965 when Project Head Start was first authorized. Over the past twenty-two years in addition to Head Start, Title I of the Elementary and Secondary Education Act, now known as Chapter 1 of the Education Consolidation and Improvement Act (ECIA) has also supported preschool programs. The concept that an earlier than traditional intervention into the cognitive growth and development of children would produce positive long-range results was the basis for the establishment and expansion of these programs.

The primary reason for initially providing these programs for economically disadvantaged youngsters was the belief that a common pattern was evident in the life cycle of these children who entered school without the experiences necessary for success in school. Their lack of readiness for school experiences resulted in the children falling further and further behind in school as they progressed through the grades causing frustration and eventual dropout. Dropping out of school produced individuals who were unable to compete in the job market; hence, many of these dropouts were destined to raise the next generation of economically disadvantaged children.

Project Head Start and other preschool programs for low socio-economic children were implemented and designed to break this cyclical pattern for disadvantaged families. Experiences provided for the children were planned to give students an opportunity to catch up with other more economically advantaged children so they would be successful as they progress through school.

The Detroit Public Schools have taken part in the federally funded prekindergarten program from its initial establishment in 1964-65. The preschool program operating in Detroit has been modified over the past twenty-two years, but the number of schools providing preschool programs has not increased significantly since the inception of the program, until very recently when some Millage Priority Preschools were added.

Purpose of the Study

The assumption that participation in a preschool program can be related to long-range educational benefits underlies this study. It was designed to investigate selected long-range effects on a selected group of Detroit school children who were provided with the experiences of a Title I Preschool Program in the 1973-74 school year.

In October, 1981, the investigator completed a doctoral dissertation entitled A Longitudinal Study of the Cognitive Growth of Pupils Who Were Participants in Preschool Programs in Three Detroit Public Schools. The dissertation was an ex post facto study of the students covering the six-year period following their participation in a Title I preschool program. The groups performance on norm-referenced reading and mathematics tests, as well as attendance, report card marks, fourth grade Michigan Educational Assessment Program (MEAP) reading and mathematics scores, and compensatory education services through grade five were all included in the research.

Students in the original study, assuming normal promotion, should have graduated from high school in June, 1987. This study involved investigating the educational progress of those students originally selected for the dissertation research.

Methodology

Students involved in the dissertation and this follow-up study were selected from three neighboring elementary schools in the Detroit public school district. In the 1973-74 school year each of the three schools provided ESEA, Title I, preschool programs. The program provided four half-day sessions of instruction to the children each week for the complete school year. The staff at each school consisted of a certified teacher, a full-time classroom aide, and another part-time aide. Each school also received the services of a social worker, a psychologist, and a language specialist. The other half of the day was used for scheduled home visits, individual tutoring of students, parent conferences, and parent education activities. Parent activities included meetings with resource persons who provided information on child development, health and nutrition, cooking, and crafts. Community excursions were also conducted for the purpose of increasing the parent's understanding of the services and activities of the community. Inservice training was also provided for the preschool staff personnel. The objectives of the program were the development of basic cognitive, motivational, and social skills of the children.

The records of the three schools were searched to determine the experimental and control groups. Students who had participated in the preschool program, had remained enrolled in the same elementary school, and had been promoted annually for the subsequent six years (K-5) became the experimental subjects.

The records of all other students, who had been enrolled in one of the three schools in kindergarten at the same time as the experimentals, had remained in the same school, and had been promoted annually for the following six years were collected to comprise a control group. The experimental

group consisted of twenty-eight subjects, and to make the groups of equivalent size twenty-eight subjects were randomly selected from the total number of pupils comprising a potential control group.

Analyses of the data and conclusions from portions of the original dissertation will be included in this report. Additionally, new data on the experimental and control students will include: reading and mathematics norm-referenced test scores (grades 6-8, 11), Student Code of Conduct data, high school report card marks, Michigan Educational Assessment Program (MEAP) tenth grade reading and mathematics scores, Detroit High School Proficiency Test results, compensatory education services, and graduation results.

Analysis of the Data

Presented first in the analyses will be the data for the experimental and control groups in grades kindergarten through five. These data are from the original dissertation and are intended to first present any differences which existed at the end of the grade five between the groups.

Table 1 presents a comparison of the attendance of the experimental and the control groups. No significant differences were found between the group means for the number of days absent from school in each of the grades kindergarten through five.

Table 1

Comparisons of Experimental and Control Group
Average Number of Days Absent
Kindergarten to Grade 5

Grade	Group	N	Mean	Standard Deviation	df	t-value
K	Experimental	28	23.4	17.2		
K	Control	28	17.4	13.4	54	1.46
1	Experimental	28	18.4	13.3		
1	Control	28	14.0	10.7	54	1.39
2	Experimental	28	16.2	12.0		
2	Control	28	11.4	8.0	54	1.76
3	Experimental	28	15.4	14.3		
3	Control	28	14.5	14.4	54	0.24
4	Experimental	28	12.4	15.3		
4	Control	28	9.5	9.1	54	0.87
5	Experimental	28	9.7	9.5		
5	Control	28	11.9	15.9	54	-0.64

In Table 2 the comparisons of the report card marks in reading in grades one through five are presented. At the fourth grade level a significant difference existed between the experimental and the control groups in favor of the experimentals. Although the differences at the other grade levels were not statistically significant the mean report card mark in reading for the experimental group was higher at all grade levels.

Table 2

Comparisons of Experimental and Control Group
Average Report Card Marks in Reading
Grade 1 to Grade 5

Grade	Group	N	Mean	Standard Deviation	df	t-value
1	Experimental	28	2.4	1.1		
1	Control	28	2.2	1.0	54	0.51
2	Experimental	28	2.6	1.1		
2	Control	28	2.1	0.9	54	1.84
3	Experimental	28	2.6	1.0		
3	Control	28	2.1	0.9	54	1.84
4	Experimental	28	2.7	0.9		
4	Control	28	2.2	0.9	54	1.95*
5	Experimental	28	2.4	1.0		
5	Control	28	2.0	0.7	54	1.49

* Statistically significant at the .01 level

The t-statistics displayed in Table 3 on mathematics report card marks of the experimental and control groups indicated that no significant differences existed between the groups. However, with the exception of grade four marks, the mean report card marks of the experimental group were higher than those of the control group.

Table 3

Comparisons of Experimental and Control Group
Average Report Card Marks in Mathematics
Grade 1 to Grade 5

Grade	Group	N	Mean	Standard Deviation	df	t-value
1	Experimental	28	2.4	1.3		
1	Control	28	2.0	0.7	54	1.54
2	Experimental	28	2.4	1.2		
2	Control	28	2.1	0.8	54	0.79
3	Experimental	28	2.5	1.1		
3	Control	28	2.3	0.9	54	0.79
4	Experimental	28	2.4	1.2		
4	Control	28	2.4	1.0	54	-0.12
5	Experimental	28	2.4	1.1		
5	Control	28	2.0	1.0	54	1.36

For a final report card mark analyses, a grade point average was computed and a t-test was used to determine if there were significant differences between the groups. The grade point averaging included using all report card marks from grades one through five. A reading, mathematics, and combined grade point average was computed. The experimental group had a statistically significant higher grade point average in reading than the control group. No significant difference existed between the groups grade point average in mathematics or combined reading and mathematics grade point averages. While not statistically significant, the mean grade point average of the experimental group was higher in all three combined areas. Data are presented in Table 4.

Table 4

Comparisons of Experimental and Control Group
Grade Point Averages
Grade 1 to Grade 5

Subject	Group	N	Mean	Standard Deviation	df	t-value
Reading	Experimental	28	2.5	0.7		
Reading	Control	28	2.2	0.5	54	2.22*
Mathematics	Experimental	28	2.4	0.9		
Mathematics	Control	28	2.2	0.6	54	1.21
Combined GPA	Experimental	28	2.5	0.8		
Combined GPA	Control	28	2.2	0.4	54	1.91

*Statistically significant at the .01 level

Table 5 presents a comparison of the average number of objectives mastered on the fourth grade Michigan Educational Assessment Program (MEAP) test in reading and mathematics. A statistically significant difference existed between the means of the number of reading objectives achieved in favor of the experimental group.

Table 5

Comparisons of Experimental and Control Group
Average Number of Objectives Attained on the
Michigan Educational Assessment Program, Grade 4

Subject	Group	N	Mean	Standard Deviation	df	t-value
Reading	Experimental	25	10.0	7.5		
Reading	Control	28	5.5	4.4	51	2.68*
Mathematics	Experimental	25	19.4	11.0		
Mathematics	Control	28	17.8	7.8	51	0.62

*Statistically significant at the .01 level

Norm-referenced test raw scores in reading and mathematics for each group at each grade level, 1-5, were also analyzed. Scores attained on norm-referenced tests administered to all pupils by the Detroit Public Schools, as part of a district-wide testing program, were compared to determine if any significant differences existed as measured by these variables. Tests administered were the following:

Grade 1 - Stanford Achievement Test, Primary 1
Grade 2 - Stanford Achievement Test, Primary 2
Grade 3 - Iowa Tests of Basic Skills, Level 9
Grade 4 - Iowa Tests of Basic Skills, Level 10
Grade 5 - California Achievement Tests, Level 15

Data are presented in Table 6 and Table 7. The experimental group scored significantly higher in reading than the control at the third, fourth, and fifth grade levels. They also scored significantly higher in mathematics in grades four and five.

Table 6

Comparisons of Experimental and Control Group
Average Raw Scores on Norm-Referenced Reading Tests
Grade 1 to Grade 5

Grade	Group	N	Mean	Standard Deviation	df	t-value
1	Experimental	28	17.9	8.6		
1	Control	28	14.0	6.5	54	1.89
2	Experimental	28	22.5	9.6		
2	Control	28	23.2	9.0	54	-0.29
3	Experimental	28	27.9	10.8		
3	Control	28	22.0	10.7	54	2.06*
4	Experimental	28	33.4	11.6		
4	Control	28	24.9	9.9	54	2.96*
5	Experimental	28	20.8	7.6		
5	Control	28	16.0	5.7	54	2.65*

*Statistically significant at the .01 level

Table 7

Comparisons of Experimental and Control Group
Average Raw Scores on Norm-Referenced Mathematics Tests
Grade 1 to Grade 5

Grade	Group	N	Mean	Standard Deviation	df	t-value
1	Experimental	28	32.7	11.0		
1	Control	28	31.3	9.4	54	0.52
2	Experimental	28	13.0	3.9		
2	Control	28	14.7	5.8	54	-1.30
3	Experimental	28	24.7	10.1		
3	Control	28	21.8	8.5	54	1.19
4	Experimental	28	27.5	10.4		
4	Control	28	20.2	5.7	54	3.25*
5	Experimental	28	42.8	14.3		
5	Control	28	35.3	9.1	54	2.37*

*Statistically significant at the .01 level

The expected rate of growth of students as measured by norm-referenced instruments is one month of growth for each month in school measured in grade equivalent units. The State of Michigan requires that the rate of gain be reported for schools which are determined to be high needs schools using the pretest and posttest data from the Title I or Article 3 state reports. The formula used to determine the rate of gain is:

Rate of Gain = 10(Posttest - Pretest)/Time Interval

This formula was used to compute the rates of gain for the experimental and control groups in this study. Rates of gain were computed for each grade level beginning with grade two. An overall rate of gain was also calculated.

Table 8

Comparisons of Experimental and Control Group
Average Rates of Gain in Reading
Grade 2 to Grade 5

Grade	Group	Pretest Mean*	Posttest Mean*	Average Rate of Gain
2	Experimental	1.7	2.1	0.4
2	Control	1.6	2.1	0.5
3	Experimental	2.1	3.9	1.8
3	Control	2.1	3.4	1.3
4	Experimental	3.9	4.7	0.8
4	Control	3.4	4.1	0.7
5	Experimental	4.7	5.1	0.4
5	Control	4.1	4.3	0.2
Total	Experimental	1.7	5.1	0.9
Total	Control	1.6	4.3	0.7

*The means are in grade equivalent units

Table 9

Comparisons of Experimental and Control Group
Average Rates of Gain in Mathematics
Grade 2 to Grade 5

Grade	Group	Pretest Mean*	Posttest Mean*	Average Rate of Gain
2	Experimental	1.7	2.3	0.6
2	Control	1.6	2.5	0.9
3	Experimental	2.3	3.2	0.9
3	Control	2.5	2.8	0.3
4	Experimental	3.2	3.9	0.7
4	Control	2.8	3.2	0.4
5	Experimental	3.9	5.5	1.6
5	Control	3.2	4.9	1.7
Total	Experimental	1.7	5.5	1.0
Total	Control	1.6	4.9	0.8

*The means are in grade equivalent units

Tables 8 and 9 present the average rate of gain in reading and mathematics for the experimental and control groups. In reading the average rate of gain of the experimental group exceeded the average rate of gain of the controls at the end of grades three, four, and five by 0.5, 0.1, and 0.2 grade equivalent units, respectively. In addition, the overall rate of gain of the experimental group exceeded that of the control group by 0.2 grade equivalent units. In mathematics the experimental group's average rate of gain exceeded the controls at the end of the third and fourth grades. Additionally, the overall rate of gain of the experimental group exceeded that of the control group by 0.2 grade equivalent units.

The rate of gain of the experimental group and control group indicate that over time the growth of the experimental group exceeded that of the control group in both reading and mathematics. Also, the rate of growth of the experimental group at the end of the fifth grade more nearly approached the rate of growth of the normative group than did that of the controls.

The students in both the experimental and control groups were provided with compensatory education service, Title I and Article 3, in grades kindergarten through five. Students may receive both Title I and Article 3 service in the same school year. Although the study only spanned a six-year period a student could have possibly received a maximum of twelve years, or units, of service if he received both services each of the six years.

Table 10 includes data which indicate how many students in the experimental and control groups received compensatory education service at each grade level, kindergarten through five. At every grade level, with the exception of grade one, the number of students in the experimental group

receiving service was less than the number of students in the control group receiving service. The total number of years of compensatory education service received by the control group exceeded the total number of years of service received by the experimental group. The experimental group received an average of 3.75 years of service compared to an average of 4.64 for the control group.

Table 10

Number of Experimental and Control Students Receiving Title I and Article 3 Compensatory Education Services from 1974 to 1980

			Number and Percent Receiving Service		
Grade	Group	N	Either TI or A3	Both TI & A3	Pct
K	Experimental	28	8	1	32
K	Control	28	14	0	50
1	Experimental	28	11	4	54
1	Control	28	7	2	32
2	Experimental	28	8	5	46
2	Control	28	14	4	64
3	Experimental	28	10	5	54
3	Control	28	12	7	68
4	Experimental	28	4	5	32
4	Control	28	6	11	61
5	Experimental	28	2	11	46
5	Control	28	5	12	61
Total	Experimental		43	31	44
Total	Control		58	36	56

Average number of years of compensatory education service	
Experimental Group	3.75
Control Group	4.64

Summary - End of Grade Five

At the end of grade five results indicated that students who were provided with a Title I preschool experience scored significantly higher on norm-referenced reading tests in grades three, four, and five than the controls. In addition, on norm-referenced mathematics tests, the experimentals scored higher than the controls in grades four and five.

The report card marks of the experimental group were significantly higher than the control group in reading at the fourth grade level as was the overall reading grade point average.

The experimental group also mastered a significantly higher number of objectives in reading on the fourth grade MEAP test than the control group.

The rate of growth of the experimental group exceeded that of the control group at every grade level with the exception of second grade mathematics. The overall rate of gain of the experimental group exceeded that of the control group by 0.2 grade equivalent units in reading and mathematics.

Additionally, the control group received an average of 4.64 years of compensatory education service while the experimental group received an average of only 3.75 years of service.

Significant differences between the experimental and control groups of the dissertation study indicated that a Title I preschool experience did result in long-range benefits for the participants through grade five.

Beyond Grade Five

The remainder of this study will include the investigation of the experimental and control groups from the 1980-81 school year through the 1986-87 school year. Data will be presented related to high school grade point averages, Michigan Educational Assessment Program (MEAP) tenth grade

reading and mathematics test scores, norm-referenced test scores in reading and mathematics, rate of gain in reading and mathematics, compensatory education service, Detroit High School Proficiency test results, Student Code of Conduct data, and high school graduation results.

High school grade point averages were analyzed, using the t-statistic, for the experimental and control groups. Data are presented in Table 11. The experimental group had a significantly higher grade point average than the control group in seven of eight semesters in high school and on the cumulative grade point average.

Table 11

Comparisons of Experimental and Control Group
High School Grade Point Averages from
February, 1984 through June, 1987

Semester	Group	N	Mean	Standard Deviation	df	t-value
February, 1984	Experimental	24	1.8	.99		
	Control	18	1.3	1.19	40	-1.44
June, 1984	Experimental	25	1.9	.94		
	Control	18	1.3	1.18	41	-1.81*
February, 1985	Experimental	25	1.9	.76		
	Control	19	1.0	1.03	42	-3.40**
June, 1985	Experimental	25	2.0	.78		
	Control	16	1.1	.92	39	-3.30**
February, 1986	Experimental	22	2.1	.81		
	Control	17	1.1	1.01	37	-3.09**
June, 1986	Experimental	23	2.0	1.40		
	Control	15	1.3	.94	36	-2.06*
February, 1987	Experimental	24	2.1	1.01		
	Control	13	1.4	1.10	35	-1.97*

Table 11 (Cont'd)

Semester	Group	N	Mean	Standard Deviation	df	t-value
June, 1987	Experimental	23	2.3	1.08		
	Control	13	1.0	1.08	34	-3.44**
Cumulative Grade Point Average	Experimental	25	2.1	.69		
	Control	22	1.3	.92	45	-3.36**

*Statistically significant at the .05 level
**Statistically significant at the .01 level

The Michigan Education Assessment Program (MEAP) test was administered to tenth grade students in October, 1984. Reported in Table 12 are the results of the t-test analyzing the MEAP reading and mathematics test results of the experimental and control groups. The experimental group scored significantly higher than the controls in reading.

Table 12

Comparisons of Experimental and Control Group Average Number of Objectives Attained on the Michigan Educational Assessment Program, Grade 10

Subject	Group	N	Mean	Standard Deviation	df	t-value
Reading	Experimental	17	19.0	3.39		
Reading	Control	11	14.3	5.40	26	-2.83*
Mathematics	Experimental	17	18.3	4.72		
Mathematics	Control	11	16.0	4.94	26	-1.21

*Statistically significant at the .05 level

Norm-referenced reading and mathematics tests were administered to the experimental and control groups in grades six, seven, eight, and eleven as part of the Detroit Public Schools city-wide testing program. Results of

the analyses of the test scores are presented in Table 13 and Table 14. Tests administered were the California Achievement Tests, Level 16, 17, 18, and 19, Form C.

Table 13

Comparisons of Experimental and Control Group
Average Raw Scores on Norm-Referenced Reading Tests
Grades 6-8 and 11

Grade	Group	N	Mean	Standard Deviation	df	t-value
6	Experimental	28	23.2	7.52		
6	Control	27	18.9	6.96	53	-2.17*
7	Experimental	24	17.6	8.28		
7	Control	21	13.6	4.47	43	-1.95*
8	Experimental	25	20.9	7.02		
8	Control	18	16.3	8.18	41	-1.94*
11	Experimental	11	25.1	5.13		
11	Control	6	19.5	3.61	15	-2.39*

*Statistically significant at the .05 level

Table 14

Comparisons of Experimental and Control Group
Average Raw Scores on Norm-Referenced Mathematics Tests
Grades 6-8, and 11

Grade	Group	N	Mean	Standard Deviation	df	t-value
6	Experimental	28	42.2	10.6		
6	Control	26	37.1	11.5	52	-1.70
7	Experimental	24	41.7	12.2		
7	Control	20	29.1	9.5	42	-3.72*
8	Experimental	25	47.4	10.1		
8	Control	18	40.7	9.4	41	-2.21*
11	Experimental	11	51.5	8.5		
11	Control	6	42.3	10.3	15	-1.97

*Statistically significant at the .05 level

The experimental group scored significantly higher than the control group as measured by norm-referenced reading tests at all four grade levels 6 through 8 and 11. The experimental group also scored significantly higher than the control group in mathematics in grade 7 and 8.

Using the norm-referenced test scores administered in the middle school grades (6-8) and in grade eleven a rate of gain was computed for both experimental and control groups in reading and mathematics. The results are reported in Table 15 and 16. The pretests for grade six are the fifth grade posttests from Tables 8 and 9.

Table 15

Comparisons of Experimental and Control Group
Average Rates of Gain in Reading
Grades 6-8 and 11

Grade	Group	Pretest Mean*	Posttest Mean*	Average Rate of Gain
6	Experimental	5.1	6.0	0.9
6	Control	4.3	5.3	1.0
7	Experimental	6.0	6.9	0.9
7	Control	5.3	5.7	0.4
8	Experimental	6.9	7.9	1.0
8	Control	5.7	6.1	0.4
11	Experimental	7.9	11.0	1.2
11	Control	6.1	8.8	1.0
Total	Experimental	5.1	11.0	1.0
Total	Control	4.3	8.8	0.8

*The means are in grade equivalent units.

Table 16

Comparisons of Experimental and Control Group
Average Rates of Gain in Mathematics
Grades 6-8 and 11

Grade	Group	Pretest Mean*	Posttest Mean*	Average Rate of Gain
6	Experimental	5.5	6.0	0.5
6	Control	4.9	5.6	0.7
7	Experimental	6.0	7.9	1.9
7	Control	5.6	6.4	0.8
8	Experimental	7.9	8.5	0.6
8	Control	6.4	8.0	1.6
11	Experimental	8.5	11.3	1.1
11	Control	8.0	9.5	0.6
Total	Experimental	5.5	11.3	1.0
Total	Control	4.9	9.5	0.8

*The means are in grade equivalent units.

In reading the average rate of gain of the experimental group exceeded the average rate of gain of the controls at the end of grade seven, eight, and eleven by 0.5, 0.6, and 0.2 grade equivalent units. Additionally the overall rate of gain of the experimentals exceeded the controls by 0.2 grade equivalent units. In mathematics the experimental group average rate of gain exceeded the controls in grades seven and eleven. The experimental groups overall rate of gain in mathematics also exceeded the controls by 0.2 grade equivalent units.

The experimental students norm-referenced reading test scores indicate that in grade eleven they were scoring 0.2 grade equivalent units below the national norms, while the control students were 2.4 grade equivalent units below national norms. In mathematics the experimental students scored 0.1

grade equivalent unit above national norms while the control students scored 1.7 grade equivalent units below national norms.

The experimental and control group students received compensatory education service both Title I (Chapter 1) and Article 3. Presented in Table 17 are the data for the experimental and control groups for the years 1980-81 through 1986-87. Included for each year are only the students for whom records were complete and who were still enrolled in the Detroit Public Schools. In five of the seven years the percent of the control group receiving compensatory education service exceeded that of the experimental group.

Table 17

Number of Experimental and Control Students Receiving Title I and Article 3 Compensatory Education Services from 1980-81 to 1986-87

School Year	Group	N	Number and Percent of Group Receiving Service: Either T1 or A3	Both T1 or A3	Pct.
1980-81	Experimental	24	5	10	63
	Control	20	4	12	80
1981-82	Experimental	24	4	8	50
	Control	20	3	8	55
1982-83	Experimental	24	4	1	21
	Control	20	5	4	45
1983-84	Experimental	28	16	1	61
	Control	28	13	0	46
1984-85	Experimental	27	6	3	33
	Control	26	5	4	35
1985-86	Experimental	25	8	1	36
	Control	21	6	1	33
1986-87	Experimental	24	1	0	4
	Control	16	2	0	13

Average number of years of compensatory education service
Experimental Group 3.64
Control Group 4.64

The Detroit High School Proficiency Test is administered to high school students beginning in grade ten. The high school examination results are utilized for high school diploma endorsement. The test includes three skill areas: reading, mathematics, and writing. Detroit High School Proficiency test results for the experimental and control groups are presented in Table 18. The number and percent of experimental students passing the proficiency examination exceeded the control students on every area of the test.

Table 18

Number and Percent of Experimental and Control Group Students Passing the Detroit High School Proficiency Examination - June, 1987

Group	N	Reading		Mathematics		Writing	
		N	Pct.	N	Pct.	N	Pct.
Experimental	24	22	92	13	54	21	88
Control	15	9	60	4	27	6	40

The Detroit Public Schools have a Student Code of Conduct. The student code includes two types of offenses; illegal and prohibited behavior. The codes for Student Code of Conduct offenses are presented below. The codes were changed in 1984-85, 1985-86, and 1986-87. Changes were taken into consideration and the offenses were coded as represented below.

Detroit Public Schools Student Code of Conduct
Offense Codes

A. Illegal Behavior

1. Threats of Violence
2. Battery
3. Possession of Weapons or Other Dangerous Objects
4. Sale, Use, Possession or Distribution of Illegal Drugs, Materials or Substances, or Alcoholic Beverages

Detroit Public Schools Student Code of Conduct
Offense Codes (Cont'd)

5. Burglary, Theft, Robbery, Larceny
6. Arson
7. Extortion, Coercion, Blackmail
8. Vandalism or Malicious Destruction of Property
9. Interference with or Intimidation of School Personnel
10. False Alarms
11. Interference with the Movement of Pupils in and out of Schools, Between Schools, or Between Home and an Assigned School
12. Other Felonious Conduct

B. Prohibited Behavior

1. Insubordination
2. Verbal Abuse
3. Loitering/Trespass
4. Refusal to Identify Self
5. Smoking in School or on School Property
6. Truancy
7. Gambling
8. Student Demonstrations
9. Disruptive or Other Misconduct

Records were searched for the school years 1979-80 through 1986-87 for student code violations for the experimental and control group students. The number and types of code violations for both groups are presented in Table 19 and Table 20. In every year except 1979-80 the number of code violations of the control group exceeded that of the experimentals. The total number of violations for the control group was more than double the total for the experimental group. Finally using the median number of code violations for the combined groups a two-way chi-square classification was used to determine if a significant difference existed between the groups related to code violations. Results are reported in Table 21.

Table 19

Number of Experimental and Control Group
Student Code of Conduct Violations
1979-80 through 1986-87

School Year	Group	N	Number of Violations Illegal	Prohibited	Total
1979-80	Experimental	28	4	1	5
	Control	28	0	0	0
1980-81	Experimental	28	3	0	3
	Control	28	8	3	11
1981-82	Experimental	28	8	2	10
	Control	28	14	11	25
1982-83	Experimental	28	5	9	14
	Control	28	9	10	19
1983-84	Experimental	28	2	7	9
	Control	28	7	28	35
1984-85	Experimental	27	0	0	0
	Control	26	2	5	7
1985-86	Experimental	24	2	2	4
	Control	22	2	3	5
1986-87	Experimental	24	0	3	3
	Control	16	1	9	10
Total	Experimental		24	24	48
	Control		43	69	112

Table 20

Number of Experimental and Control Group
Student Code of Conduct Violations
1979-80 Through 1986-87 by Offense Code

Student Code Offense	Experimental	Control
A - Illegal		
01 Threats of Violence-Assault	3	4
02 Battery	19	35

Table 20 (Cont'd)

Number of Experimental and Control Group
Student Code of Conduct Violations
1979-80 Through 1986-87 by Offense Code

Student Code Offense	Experimental	Control
03 Possession of Weapon		1
04 Sale, Use, Possession		
05 Burglary, Robbery, Theft		
06 Arson	1	
07 Extortion		1
08 Vandalism		
09 Interference with Personnel	1	
10 False Alarms		
11 Interference with Pupils		
12 Other Felonious Conduct		2
Total Illegal	24	43
B - Prohibited		
01 Insubordination	3	13
02 Verbal Abuse		5
03 Loitering/Trespass	3	5
04 Refusal to Identify Self		4
05 Smoking		1
06 Truancy	11	25
07 Student Demonstrations		
08 Gambling	1	
09 Disruptive or Other Misconduct	6	16
Total Prohibited	24	69
Total Violations	48	112

Table 21

Median Test on the Student Code Violations of the Experimental and Control Groups

Group	Number in Group Not Above Median	Number in Group Above Median	Row Totals
Experimental	16	9	25
Control	7	16	23
Column Totals	23	25	N=48

Median = 2 df = 1
Chi-square = 5.49 significant at the .05 level

The next analyses of data for the experimental and control groups involved cumulative high school grade point averages and hours of high school credit earned.

Using a median split for the individual cumulative grade point averages of the groups and the number of hours of high school credit accumulated a two-way chi-square classification was used to determine if any significant differences occurred between the groups. Results of the analyses are presented in Table 22 and Table 23.

Table 22

Median Test on the Cumulative Grade Point Averages of the Experimental and Control Groups - June, 1987

Group	Cumulative GPA 0 - 1.71	Cumulative GPA 1.72 - 3.07	Row Totals
Experimental	7	21	28
Control	21	7	28
Column Totals	28	28	N=56

Median = 1.71 df = 1
Chi-square = 14.00 significant at the .001 level

25

Table 23

Median Test on the Number of Hours
of High School Credit Earned by
Experimental and Control Groups - June, 1987

Group	Number of Hours of Credit Earned 0 to 105	106 to 200+	Row Totals
Experimental	6	22	28
Control	22	6	28
Column Totals	28	28	N=56

Median = 105.4 df = 1
Chi-square = 18.28 significant at the .001 level

Significant differences existed between the groups, in both cumulative grade point average and number of hours of high school credit earned in favor of the experimental group.

Presented in Table 24 are the high school graduation results for the experimental and control groups. In addition to the number of students who graduated, the status of the remaining members of the groups is presented.

Table 24

Status of the Experimental and Control Group
Students in June, 1987

	Group Experimental N	Control N
Graduated June, 1987	15(10)*	4(3)*
Left School System-Overage	3	5
Non-Return	2	5
To Institution-Other than Youth Home		1
Transferred to Other School District		3
Still Enrolled - DPS	8	10
Total	28	28

*Number of students graduating with endorsed diplomas

The experimental group has eight members still enrolled in the Detroit Public Schools while the control group has ten members still enrolled. Presented in Table 25 are the grade levels of those students still enrolled. Grade level was determined by the number of hours the students had earned in high school through June, 1987.

Table 25

Grade Levels of Experimental and Control Group Students Still Enrolled in Detroit Public Schools upon Completion of June, 1987 Semester

Grade Level	Number of Hours Earned	Group Experimental	Control
9A	25-49		1
10B	50-74	1	4
10A	75-99		3
11B	101-124	1	
11A	125-149	1	
12B	150-174	1	
12A	175-200	4	2
	Total	8	10

Analyses of the data for the experimental and control groups from 1980-81 through 1986-87 indicates that as the groups entered middle school and high school, the differences between the groups became much more profound than while they were enrolled in elementary school.

Summary of Findings

Attendance for the experimental and control groups was followed through grade five only. At the end of grade five, no significant differences were found between the groups related to the mean number of days absent in grades

kindergarten through five.

In elementary school the experimental group had significantly higher report card marks in reading at grade four. Additionally, when an overall grade point average in grades one through five was calculated, the experimental group had a significantly higher overall grade point average in reading. There were no differences in the groups related to mathematics report card marks. At the high school level the experimental group had a significantly higher grade point average than the controls in seven semesters out of eight. The experimental group also had a significantly higher cumulative grade point average in high school than the controls.

Results of the Michigan Educational Assessment Program (MEAP) test at grades four and ten indicated a statistically significant difference between the groups related to the number of reading objectives mastered. No statistically significant differences existed between the groups on the number of mathematics objectives mastered at grade four or ten on the MEAP tests.

Norm-referenced tests were administered to both groups in grades one through eight and eleven as part of the district-wide testing program. The experimental group scored at a significantly higher level than the controls in reading in grades three, four, five, six, seven, eight, and eleven. In mathematics the experimental group outperformed the control group in grades four, five, seven, and eight.

Using the norm-referenced test scores of each group, a rate of gain was calculated for each group through grade eleven. The overall rate of gain for the experimental group indicated that they gained an average of 0.9 grade equivalent units in reading for grades one through five and 1.0 grades equivalent units in reading for grades six through eleven. The overall rate

of gain for the control group was 0.2 grade equivalent units less than the experimental group in reading for both grades one through five and six through eleven. Results of rate of gain indicated that by grade eleven the experimentals were only 0.2 grade equivalent units below national norms in reading while the controls scored 2.4 grade equivalent units below national norms. In mathematics the experimentals gained an average of 1.0 grade equivalent units each year in grades one through five and six through eleven. The controls gained an average of 0.8 grade equivalent units each year in grades one through five and eight through eleven. At the eleventh grade level the experimentals were scoring one month above national norms in mathematics while the controls were scoring 1.7 grade equivalent units below the normed group.

Both experimental and control group students received compensatory education service in grades kindergarten through twelve. Services were provided by both Title 1 (Chapter 1) and Article 3. In ten of the thirteen years the percent of the control group receiving service exceeded the experimental group.

The number and percent of the experimental group passing Detroit's High School Proficiency Examination exceeded the control group in every area; reading, mathematics, and writing.

The number of Student Code of Conduct violations for the control group exceeded the experimentals in seven out of eight years. The total number of violations for the control group was more than twice the total for the experimentals. The control group had a significantly higher number of code violations than the experimentals.

Analyses of the cumulative grade point averages and number of hours of high school credit earned by each group also resulted in statistically

significant differences between the groups. The difference was in favor of the experimentals in both cumulative grade point average and number of high school credits earned.

Finally, when looking at graduation results for both groups in June, 1987, fifty-four percent of the experimental group graduated while only fourteen percent of the control group graduated.

Conclusions and Recommendations

An underlying assumption to the appropriateness of the t-statistic procedure is randomization of assignment of pupils to either the experimental or control group. Threatening the internal validity of the study is the possible effect of self-selection. The experimental group was self-selected in the sense that the parents sought out preschool for them. A control group was not available from the population of program seekers; therefore, any assumption of uniform regression between experimental and control groups becomes less likely and selection interaction becomes more probable.

It is also important to note that annual promotion through grade five was a criteria for selection for both groups included in the study. Students in both the experimental and the control group had experienced success in elementary school as indicated by this annual promotion.

The most significant cognitive difference between the groups was related to reading. The experimental group outperformed the control group at the elementary, middle school, and high school level in reading. While differences did exist in favor of the experimental group related to mathematics the differences were not as consistent as in reading.

The control group students were selected to receive compensatory education service with greater frequency than the experimentals. Fifty percent of the control group receive compensatory education service in kindergarten. The

service did not, however, appear to ameliorate the achievement of the control group.

Student Code of Conduct data indicated that the control group began to exhibit more negative and unacceptable behavior as they reached middle school and grade nine than the experimental group. During this same period of time the control group students began to be retained in grade.

The greatest disparity between the groups was exhibited by their high school records. The experimental group outperformed the controls in high school grade point average, number of high school credits earned, and number of graduates.

Results of this study indicate that a preschool experience can make a significant difference in the lives of young people. In addition to the preschool experience the experimental group had parents who sought the program for their children. The parents' efforts in enrolling their children in the program may be evidence that education was a high family priority. The differences in the groups' reading achievement seems to show that reading skill in upper elementary, middle, and high school is closely related to completion of high school.

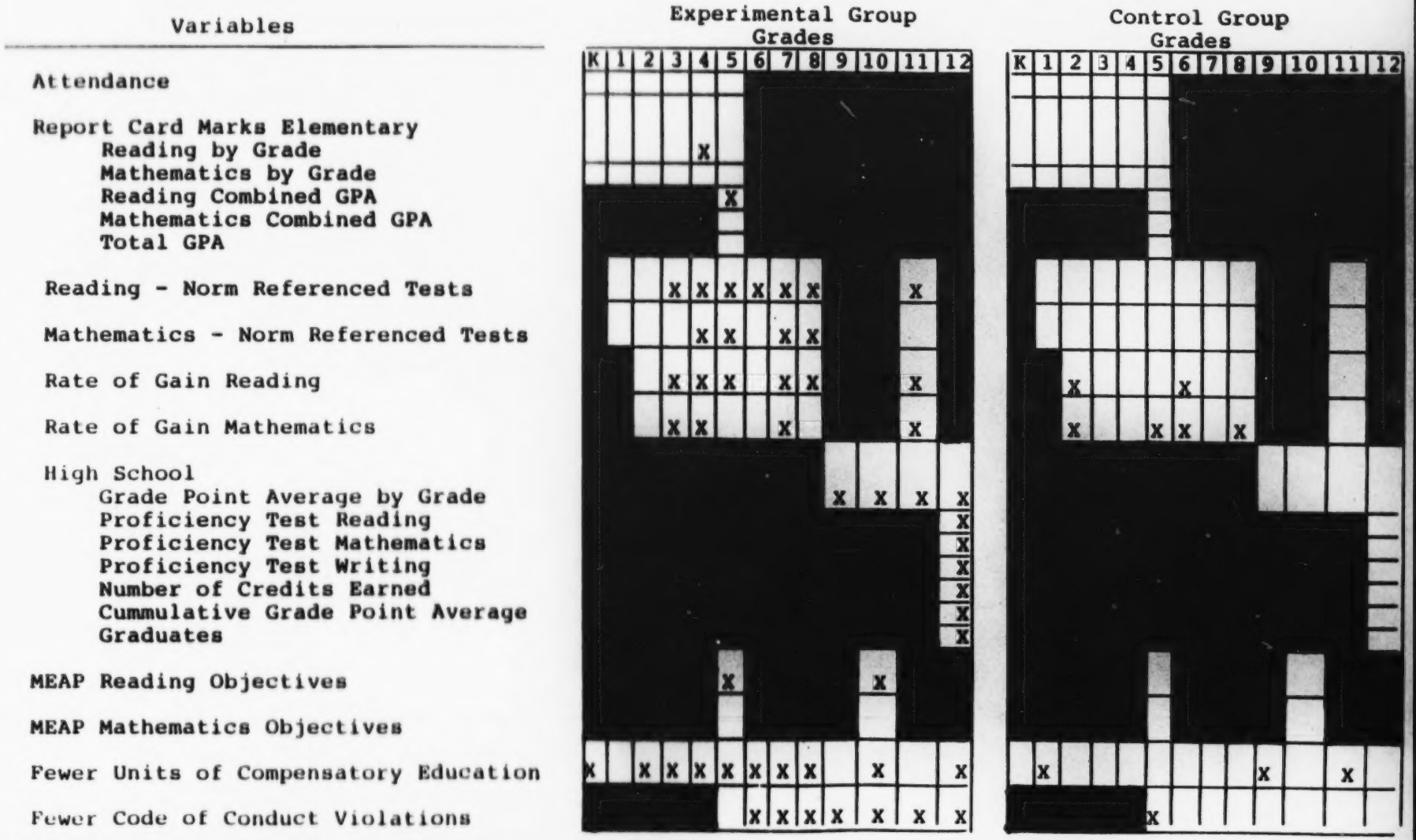
It is recommended that the students from both groups who are still enrolled in the Detroit Public Schools be followed to determine whether additional students graduate.

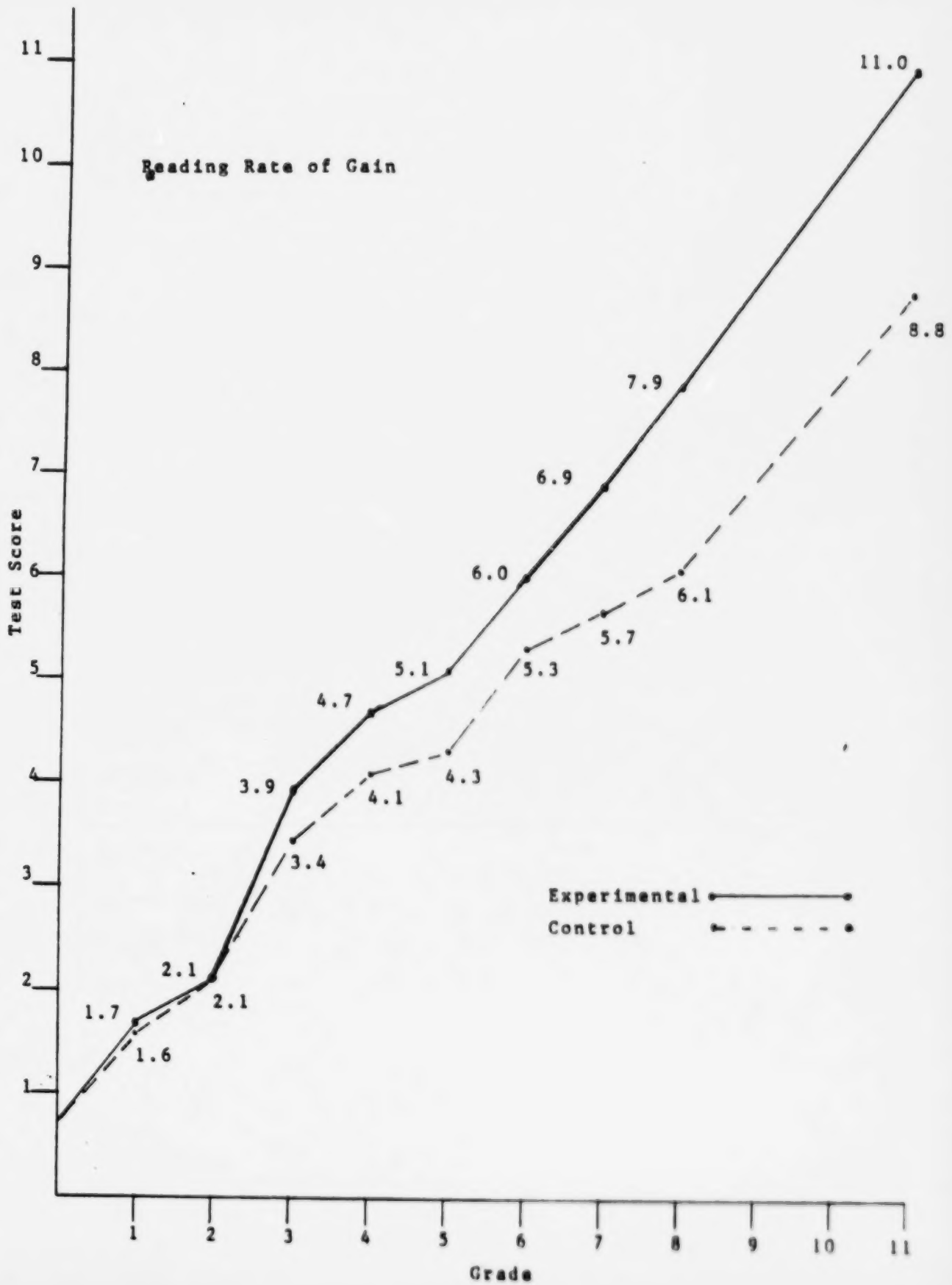
Replication of this study should certainly be considered. Even though longitudinal studies require a great deal of data collection, the district should also consider doing additional such studies for other programs in the system. Data retrieval and historical records of students could be improved which would facilitate these studies.

Finally, although the control group received more compensatory education than the experimentals, the service did not appear to effect the students achievement enough to prevent dropping out. Longitudinal studies related to any impact of the district's compensatory education service on the graduates or dropouts should be conducted.

APPENDIX

Summary Chart of Variables and Performance of Experimental and Control Groups




Reading Rate of Gain
Test Score
Grade
Experimental
Control
11.0
8.8
7.9
6.9
6.0
6.1
5.7
5.3
5.1
4.7
4.3
4.1
3.9
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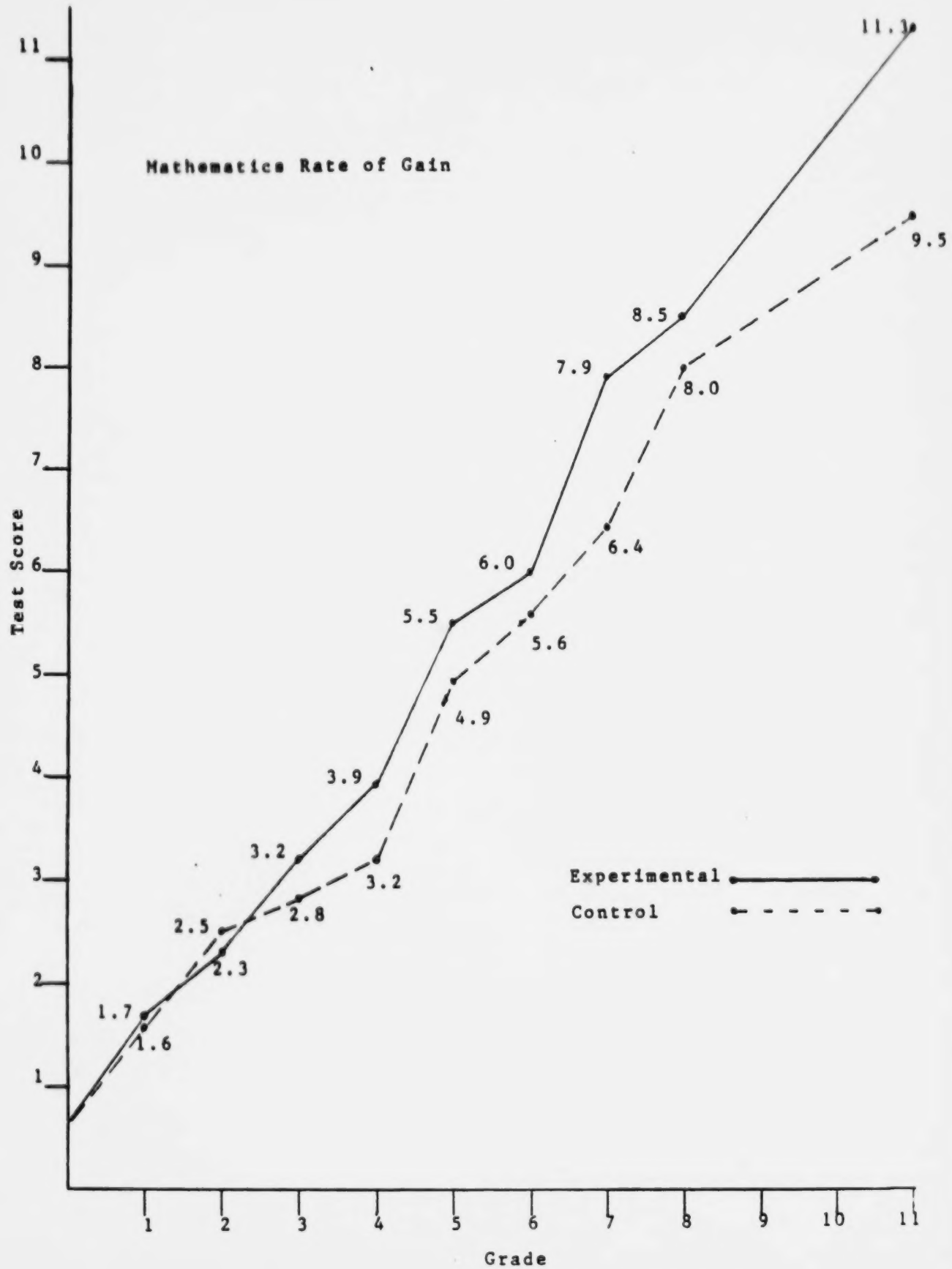
2
3
4
5
6
7
8
9
10
11


Mathematics Rate of Gain
Test Score
Grade
Experimental
Control
1.7
1.6
2.5
2.3
3.2
2.8
3.9
3.2
5.5
4.9
6.0
5.6
7.9
6.4
8.5
8.0
11.1
9.5